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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/565,535	07/17/2006	Hiroki Sasaki	Q92477	9912

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EXAMINER

REDDY, KARUNA P

ART UNIT	PAPER NUMBER
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1713

MAIL DATE	DELIVERY MODE
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08/16/2007

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/565,535	Applicant(s) SASAKI ET AL.	
	Examiner Karuna P. Reddy	Art Unit 1713	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-16 is/are pending in the application.
 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-16 is/are rejected.
- 7) ☒ Claim(s) 8-11 and 13-16 is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on ____ is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. ____.
 3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|--|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date <u>1/23/2006, 7/17/2006</u> | 6) <input type="checkbox"/> Other: ____ |

DETAILED ACTION

1. Claims filed on Jan 23, 2006 are made of record. Claims 1-16 are currently pending in the application.

Claim Objections

2. Claims 8-11 and 13-16 are objected to under 37 CFR 1.75(c) as being in improper form because a multiple dependent claim should refer to other claims in the alternative only and/or cannot depend from any other multiple dependent claim. See MPEP § 608.01(n).

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

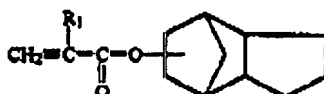
(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:
 1. Determining the scope and contents of the prior art.
 2. Ascertaining the differences between the prior art and the claims at issue.
 3. Resolving the level of ordinary skill in the pertinent art.

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4. Considering objective evidence present in the application indicating obviousness or nonobviousness.
5. Claims 1-2, 4, 6-16 rejected under 35 U.S.C. 103(a) as being unpatentable over Kawai et al (US RE34,061 - is the same as EP 1 41610 A) in view of Koike (US 5, 767, 200).

Kawai et al disclose a polymer obtained by polymerizing tricyclo[5.2.1.0.2,6]deca-8-yl (meth)acrylate in an amount by weight of 100-5% by weight. The polymer is excellent in transparency, moisture resistance and heat resistance and is suitable as a material for optical elements (abstract). The polymer of this invention includes a homopolymer obtained by polymerizing a compound of the following formula (column 2, lines 63-68) wherein R_1 is a hydrogen or a methyl group.



The tricyclo[5.2.1.0.2,6]deca-8-yl (meth)acrylate is prepared by a conventional process for synthesizing a (meth)acrylic acid ester (column 3, lines 1-5). The tricyclo[5.2.1.0.2,6]deca-8-yl (meth)acrylate can be prepared by ester exchange reaction of tricyclo[5.2.1.0.2,6]deca-8-ol with methyl (meth)acrylate or condensation reaction with (meth)acrylic acid or (meth)acrylic acid chloride (column 3, lines 8-12).

The prior art is silent with respect to deuteration of tricyclo[5.2.1.0.2,6]deca-8-yl (meth)acrylate.

However, Koike et al teach optical resin material wherein it is desirable to have high transparency i.e. transmittancy in the operating wavelength of an optical device. Optical absorbance attributable to expansion and contraction of the C-H bond interferes with absorbance peak wavelength in some cases and coincides with the operating wavelength. The 4th, 5th, 6th and 7th harmonics with an absorbance at 901 nm, 736 nm, 627 nm and 549 nm respectively fall within the wavelength region which is mainly used in the optical communication field.

Where the C-H bond of the molecules of optical resin material are replaced by C-D bond, the above-mentioned peaks disappear. The threshold transmission loss values are drastically improved compared with the case of C-H bond. To obtain an optical resin material with its C-H bond replaced by C-D bond, an MMA-d8 monomer with its H-atom replaced by a D atom may be used for the polymerization to obtain a resin (column 14-61). Therefore, it would have been obvious to one skilled in the art at the time invention was made to replace the hydrogen atoms of C-H bond, in tricyclo[5.2.1.0.2,6]deca-8-yl (meth)acrylate of Kawai et al, with deuterium i.e. heavy hydrogen and obtain a resin for use in optical members with desirable transparency or transmittancy in the operating wavelength of an optical device.

As to the extent of dueteration of tricyclo[5.2.1.0.2,6]deca-8-yl (meth)acrylate in claims 1-2, 4 and 6-16, it is held that where the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation. See In re Antonie,

559 F.2d 618, 195 USPQ 6 (CCPA 1977). See also *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980). See also *Peterson*, 315 F. 3d at 1330, 65 USPQ 2d at 1382 ("The normal desire of scientists or artisans to improve upon what is already generally known provides the motivation or desire to determine where in a disclosed set of percentage ranges is the optimum range of percentages). Therefore, in the absence of criticality or unexpected results, it would have been obvious to one skilled in the art at the time invention was made to alter the number of hydrogen atoms to be replaced by heavy hydrogen in tricyclo[5.2.1.0.2,6]deca-8-yl (meth)acrylate of Kawai et al as a matter of routine optimization and arrive at the instant invention. Furthermore, the terms 20% or more, 40% or more, 10% or more and 50% or more in claims 6-7, 9 and 14 are interpreted by examiner as being totally deuterated. Likewise, the terms not greater than 15 and not greater than 12, of light hydrogen atoms in claims 8 and 10 respectively are interpreted by examiner as complete deuteration with light hydrogen atoms being 0.

As to absorbance at 910 nm of claim 16 being 50% or smaller, in light of the fact that Kawai et al in view of Koike et al teaches / discloses an optical member comprising essentially similar polymer as that of the claimed, one of ordinary skill in the art would have a reasonable basis to believe that optical member comprising polymer of prior art exhibits essentially the same property(ies). Since PTO cannot conduct experiments, the burden of proof is

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shifted to the applicants to establish an unobviousness difference. See *In re Best*, 562 F.2d 1252, 1254, 195 USPQ 430, 433 (CCPA 1977).

6. Claims 1-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Takase et al (US 2003/0021943 A1) in view of Koike (US 5, 767, 200).

Takase et al disclose a resin composition and the optical parts prepared from the resin composition. The resin composition comprises monofunctional (meth)acrylate as component B (abstract). In the present invention, a compound other than the component B can be used as the optical component (herein referred to as unsaturated monomer). As the unsaturated monomer, a monofunctional monomer and a polyfunctional monomer can be used (paragraph 0031). As examples of commercially available products of the monofunctional monomers FA-511A and FA-513A can be given (paragraph 0034). FA-511A and FA-513A are tricyclo[5.2.1.0.2,6]decenyl acrylate and tricyclo[5.2.1.0.2,6]decyl acrylate respectively¹.

The prior art is silent with respect to deuteration of tricyclo[5.2.1.0.2,6]decyl acrylate and tricyclo[5.2.1.0.2,6]decenyl acrylate.

However, Koike et al teach optical resin material wherein it is desirable to have high transparency i.e. transmittancy in the operating wavelength of an optical device. Optical absorbance attributable to expansion and contraction of the C-H bond interferes with absorbance peak wavelength in some cases and

coincides with the operating wavelength. The 4th, 5th, 6th and 7th harmonics with an absorbance at 901 nm, 736 nm, 627 nm and 549 nm respectively fall within the wavelength region which is mainly used in the optical communication field.

Where the C-H bond of the molecules of optical resin material are replaced by C-D bond, the above-mentioned peaks disappear. The threshold transmission loss values are drastically improved compared with the case of C-H bond. To obtain an optical resin material with its C-H bond replaced by C-D bond, an MMA-d8 monomer with its H-atom replaced by a D atom may be used for the polymerization to obtain a resin (column 14-61). Therefore, it would have been obvious to one skilled in the art at the time invention was made to replace the hydrogen atoms of C-H bond, in tricyclo[5.2.1.0.2,6]decyl acrylate and tricyclo[5.2.1.0.2,6]decenyl acrylate of Takase et al, with deuterium i.e. heavy hydrogen and obtain a resin for use in optical members with desirable transparency or transmittancy in the operating wavelength of an optical device.

As to the extent of dueteration of tricyclo[5.2.1.0.2,6]decyl acrylate and tricyclo[5.2.1.0.2,6]decyl acrylate in claims 1-16, it is held that where the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation. See *In re Antonie*, 559 F.2d 618, 195 USPQ 6 (CCPA 1977). See also *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980). See also *Peterson*, 315 F. 3d at 1330, 65 USPQ 2d at 1382 ("The normal desire of scientists or artisans to improve upon what is

¹ The reference of Hitachi Chemical is provided as evidence to the molecular structure of FA-511A and

already generally known provides the motivation or desire to determine where in a disclosed set of percentage ranges is the optimum range of percentages). Therefore, in the absence of criticality or unexpected results, it would have been obvious to one skilled in the art at the time invention was made to alter the number of hydrogen atoms to be replaced by heavy hydrogen in tricyclo[5.2.1.0.2,6]decyl acrylate and tricyclo[5.2.1.0.2,6]decenyl acrylate of Takase et al as a matter of routine optimization and arrive at the instant invention. Furthermore, the terms 20% or more, 40% or more, 10% or more and 50% or more in claims 6-7, 9 and 14 are interpreted by examiner as being totally deuterated. Likewise, the terms not greater than 15 and not greater than 12, of light hydrogen atoms in claims 8 and 10 respectively are interpreted by examiner as complete deuteration with light hydrogen atoms being 0.

As to absorbance at 910 nm of claim 16 being 50% or smaller, in light of the fact that Takase et al in view of Koike et al teaches / discloses an optical member comprising essentially similar polymer as that of the claimed, one of ordinary skill in the art would have a reasonable basis to believe that optical member comprising polymer of prior art exhibits essentially the same property(ies). Since PTO cannot conduct experiments, the burden of proof is shifted to the applicants to establish an unobviousness difference. See *In re Best*, 562 F.2d 1252, 1254, 195 USPQ 430, 433 (CCPA 1977).

Conclusion

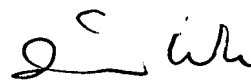
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Karuna P. Reddy whose telephone number is (571) 272-6566.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Wu can be reached on (571) 272-1114. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Karuna P Reddy
Examiner
Art Unit 1713

/KR/



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SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 1700